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$L_n(\epsilon)=\sum_0^\infty(-1)^m m!\epsilon^m/[(m+n+1)!]=(1/\epsilon^{n+1})\,{}_0\int^\epsilon\ldots{}_0\int^\epsilon\log(1+\epsilon)\,(d\epsilon)^n$. The L's appear to be functions hitherto unrecognized.

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